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I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003906487 for a patent by A.H.C. CARLISLE as filed on 25 November 2003.



WITNESS my hand this
Fifteenth day of November 2004

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AUSTRALIA

Patents Act 1990

**COMPLETE SPECIFICATION
STANDARD PATENT**

**Integrated Concrete and Plastic Modular Walls
Mark 3 version
24th November 2003**

**The following statement is a full description of this invention,
including the best method of performing known to me.**

Integrated Concrete and Plastic Modular Walls

(described as PrecisionWall in the text)

This invention of concrete filled modular formwork tubes and H section spacers relates to an improved method of constructing load bearing walls for houses and light industrial and commercial buildings. The PrecisionWall system consists of concrete filled plastic formwork tubes with H section spacers which allows easy and accurate fixing of plasterboard and stud framework.

Cottage housing requires a load bearing wall system to be constructed at an early stage of the construction process to enable upper floors, doors, windows and a roof system to be fitted or built. Existing wall systems have a variety of problems which briefly are-

Brick walls are perceived to be a premium product but supply suffers from periodic shortages of tradesmen and bricks. Brick walls require plastering and the finished walls are subject to many disputes because of cracks and other defects.

Stud walls, concrete tilt panels, precast concrete panels and cavity brick walls have low levels of insulating efficiency unless substantial amounts of insulating materials are used and this is technically very difficult with a cavity brick wall.

Energy efficient design requires a substantial mass of walls protected by an outer insulating layer and this cannot be achieved by light weight stud walls. Insulating a cavity brick wall has technical problems and would probably not produce a high level of internal mass. Insulating any form of concrete wall requires an outer layer of insulated studwork to be constructed and fixed to the concrete.

Stud walls of timber or steel have low levels of acoustic efficiency because of their light weight.

Concrete walls made by the tilt system are not as adaptable as brickwork because detailed formwork is needed for housing. Precast concrete panels are expensive and relatively inflexible as to variations in design. Additionally concrete precast or tilt panel walls require expensive preparation before plasterboard can be fixed to interior surfaces.

The PrecisionWall system overcomes the above problems as follows:-

Labour - a skilled supervisor with unskilled labour can erect the plastic tubular formwork thereby taking bricklayers out of the system except where non-load bearing external walls are needed. Additionally plastering is replaced by plaster sheeting to produce a superior wall surface. Furthermore the plastic components of PrecisionWall allow easy fixing of studs and wall sheeting.

Compatibility - PrecisionWall will mainly be dimensioned to be compatible with frequently used dimensions in the building industry so that as an example standard plasterboard sheeting can be economically used.

Flexibility - PrecisionWall provides a flexible system which can economically provide the variable shapes and dimensional accuracy required by the housing industry.

Thermal Efficiency - PrecisionWall provides a very strong concrete core and up to 150mm of insulation thereby providing a level of insulating efficiency of about 8 times that of a cavity brick wall. Additionally PrecisionWall has its insulating layers on the outside thereby giving a high thermal mass on the inside to enable high levels of energy efficiency.

PrecisionWall will provide very accurate wall surfaces and openings thereby making it easier for succeeding trades to complete their work to a high standard.

PrecisionWall can be varied dimensionally and differing plastics can be used. However the main completed product dimensions will match industry standards and the formwork will usually be made of PVC.

Buildings which use PrecisionWall can be constructed more quickly and to a higher standard than similar buildings using bricks or precast panels.

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To assist with understanding the invention, reference will now be made to the accompanying drawings which show one example of the invention.

5	<p>FIGURE 1</p> <p>Shows a cutaway perspective view of a section of an internal PrecisionWall.</p> <p>(1) is the PVC side wall. (2) is the concrete which fills the PVC tube. (3) is the 2H plastic spacer which is placed at 600mm centres and is used for fixing the plasterboard sheets. (4) is the plasterboard sheeting.</p>
10 15	<p>FIGURE 2</p> <p>Shows a perspective view of PrecisionWall tube.</p> <p>(1) is the wall face. (2) is a typical hole in the side wall and which allows the concrete to flow from tube to tube during the filling phase. (3) is the side wall which is butted against the next tube. (4) is the centre web (which is partly shown) which is also drilled with holes to the same pattern as the side wall. (5) are the holes into which the concrete is poured. (6) are the levels to which each concrete pour is made to minimise hydrostatic pressures on the plastic tube walls. (7) are the holes (partly shown) on the opposing side wall.</p>
20	<p>FIGURE 3</p> <p>Shows the face wall of a PrecisionWall tube.</p> <p>(1) is the face wall. (2) is a typical hole in the side walls and the centre web. (3) is the centre web.</p>
25	<p>FIGURE 4</p> <p>Shows a plan view of a PrecisionWall tube.</p> <p>(1) is the face wall. (2) is the holes in each side wall and centre web. (3) is the centre web.</p>

30	<p>FIGURE 5</p> <p>Shows a section of side wall.</p> <p>(1) is the side wall. (2) is a typical hole in the side walls and the centre web.</p>
5 10	<p>FIGURE 6</p> <p>Shows a plan view of a 1H spacer and is used either as a connector between two tubes or to provide a flat wall section which will allow formwork to be clamped to the PrecisionWall tubes .</p> <p>(1) is the centre web of the spacer and it has holes to the same pattern as the side walls of the PrecisionWall tubes. (2) is the locating web which forms a U channel into which the PrecisionWall tube is fitted.</p>
15 20	<p>FIGURE 7</p> <p>Shows a plan view of a 2H spacer which is used on external walls so that plasterboard can be fixed to the inside surface and 150mm U channel can be fixed to the cavity face.</p> <p>(1) is the centre web of the spacer and it has holes to the same pattern as the side walls of the PrecisionWall tubes. (2) Is the locating web which forms a U channel into which the PrecisionWall tube is fitted. (3) is the fixing web which is used to glue or screw fix the plasterboard sheet.</p>
25 30 35	<p>FIGURE 8</p> <p>Shows a plan view of a 3H spacer which is used on internal walls so that plasterboard can be fixed to the inside surfaces.</p> <p>(1) is the centre web of the spacer and it has holes to the same pattern as the side walls of the PrecisionWall tubes. (2) is the locating web which forms a U channel into which the PrecisionWall tube is fitted. (3) is the fixing web which is used to glue or screw fix the plasterboard sheet. (4) is the void web which creates a void between the plasterboard and the PrecisionWall tube and allows the PrecisionWall tube to distend with hydrostatic pressure when filled with wet concrete and not affect the alignment of the plasterboard.</p>

5 10	<p>FIGURE 9</p> <p>Shows an elevation of a 1H spacer and is used either as a connector between two tubes or to provide a flat wall section which will allow formwork to be clamped to the PrecisionWall tubes .</p> <p>(1) is the locating web which forms a U channel into which the PrecisionWall tube is fitted.</p> <p>(2) is the centre web of the spacer and it has holes to the same pattern as the side walls of the PrecisionWall tubes.</p> <p>(3) is the hole which allows the concrete to flow and form a continuous mass.</p>
15 20 25 30	<p>FIGURE 10</p> <p>Shows a plan view of a 2H spacer which is used on external walls so that plasterboard can be fixed to the inside surface and 150mm U channel can be fixed to the cavity face.</p> <p>(1) is the locating web which forms a U channel into which the PrecisionWall tube is fitted.</p> <p>(2) is the centre web of the spacer and it has holes to the same pattern as the side walls of the PrecisionWall tubes.</p> <p>(3) is the hole which allows the concrete to flow and form a continuous mass.</p> <p>(4) is the void web which creates a void between the plasterboard and the PrecisionWall tube and allows the PrecisionWall tube to distend with hydrostatic pressure when filled with wet concrete and not affect the alignment of the plasterboard.</p> <p>(5) is the fixing web which is used to glue or screw fix the plasterboard sheet.</p>
35 40	<p>FIGURE 11</p> <p>Shows an elevation of a 3H spacer which is used on internal walls so that plasterboard can be fixed to the inside surfaces.</p> <p>(1) is the locating web which forms a U channel into which the PrecisionWall tube is fitted.</p> <p>(2) is the centre web of the spacer and it has holes to the same pattern as the side walls of the PrecisionWall tubes.</p> <p>(3) is the hole which allows the concrete to flow and form a continuous mass.</p>

5	<p>(4) is the void web which creates a void between the plasterboard and the PrecisionWall tube and allows the PrecisionWall tube to distend with hydrostatic pressure when filled with wet concrete and not affect the alignment of the plasterboard.</p> <p>(5) is the fixing web which is used to glue or screw fix the plasterboard sheet.</p>
10	<p>FIGURE 12</p> <p>Shows an elevation view of a PrecisionWall tube covered with a 3H spacer and fitted to a floor channel. Plasterboard has been fixed to both faces to create an internal wall.</p> <p>(1) is the concrete ground slab.</p> <p>(2) is the floor channel which can be made of plastic or metal and is fixed to the ground slab as the first stage of the procedure.</p> <p>(3) is the 3H spacer fitted against the PrecisionWall tube and resting on the floor channel. The holes in the spacer are aligned with the holes in the PrecisionWall tube.</p> <p>(4) is the plasterboard which is placed on the floor channel and then fixed to the 3H fixing web.</p> <p>(5) is the PrecisionWall tube fitted to the floor channel.</p> <p>(6) is the locating web.</p> <p>(7) is the fixing web.</p>
15 20 25 30	<p>FIGURE 13</p> <p>Shows a plan view of 1H spacers fitted to PrecisionWall tubes and is used to provide a flat wall section which will allow formwork to be clamped to the assembly prior to the concrete pour. The formwork will be rigid steel C sections which will ensure straightness and correct alignment of the assembled wall.</p> <p>(1) is a PrecisionWall tube.</p> <p>(2) is a 1H spacer.</p> <p>(3) are spacers which can be used to match the thickness of the locating webs and maintain the wall straightness.</p> <p>(4) is C section formwork</p>

	FIGURE 14	
35		Shows a plan view of 2H spacers fitted to PrecisionWall tubes. The assembly forms the basis of an external wall. (1) is a PrecisionWall tube. (2) is a 2H spacer. (3) is the fixing web to which the plasterboard is fixed. (4) is the fixing web to which the steel U channels are screwed to allow fibre cement, steel sheeting or timber as the outer cladding.
40		
	FIGURE 15	Shows a plan view of 3H spacers fitted to PrecisionWall tubes. The assembly forms the basis of an internal wall. (1) is a PrecisionWall tube. (2) is a 3H spacer. (3) is the fixing web to which the plasterboard is fixed.
	FIGURE 16	
20		Shows a plan view of 3H spacers fitted to PrecisionWall tubes with plasterboard fixed. The assembly forms an internal wall. (1) is a PrecisionWall tube. (2) is a 3H spacer which is at 600mm maximum centres. (3) is the plasterboard which is fixed by self drilling screws into the plastic spacer or glued. (4) is the void which allows for distortion of the face of the PrecisionWall tubes.
25		
	FIGURE 17	
30		Shows a plan view of 2H spacers fitted to PrecisionWall tubes with plasterboard fixed to one face and steel U channel fixed to the other face. Timber battens are fitted to the U channel and sheeting is fixed to the battens. The void formed by the U channels are filled with insulating material. The assembly forms an external wall with a thermal efficiency about 8 times better than a cavity brick wall and with a high thermal mass benefit for the house. (1) is a PrecisionWall tube. (2) is a 2H spacer which is at 600mm maximum centres. (3) is the plasterboard which is fixed by self drilling screws into the plastic spacer or glued. (4) is the void which allows for distortion of the face of the PrecisionWall tubes. This void can also be used
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		for placing insulating materials to increase the insulating value of the wall. However the thermal mass benefits are reduced.
5		(5) is the steel U channel(a Z section could be used).
		(6) is the insulating material which can be up to 150mm thick.
10		(7) is the timber batten which forms a stable base for fixing fibre cement sheet. If timber or steel cladding is used then the timber batten can be eliminated.
		(8) is the exterior cladding.
	FIGURE 18	
15		Shows an elevation of a window opening ready for the fixing of the window frame and glass.
		(1) is the window opening.
		(2) is a short length PrecisionWall tube filled with concrete and the top of which forms the base for the inside window ledge.
20		(3) is a PrecisionWall tube cut to length to form a lintel support tube.
		(4) is a standard PrecisionWall tube to which the roof is attached.
25		(5) is the U channel (a Z section could be used) fixed at no more than 600mm centres to the PrecisionWall.
		(6) is the timber batten used to fix the external cladding to the exterior face.
30		(7) is a PrecisionWall tube fitted horizontally by its side face to the wall and just below the tubes shown as (2) to form the window sill. The mating faces of the tubes are drilled to allow concrete to flow between them. The sill upper surface can be dressed with tiles, render etc. The window frame is fixed to the sill upper surface.
35		(8) is PrecisionWall tube resting on the sill tube and flush against the lintel support tube. The mating faces of the tubes are drilled to allow concrete to flow between them.
		(9) is the top member of the window tube assembly and is fitted flush against the lintel tube and resting on the tubes described in (8) above.
40		(10) is the first lintel tube which is a PrecisionWall tube laid horizontally on the lintel support tubes and with holes to allow the flow of concrete from the horizontal tube to the vertical tube.
45		(11) is the second lintel tube (this tube can be deleted or duplicated according to the design) and is laid on the

5	<p>first tube with holes in the mating faces to allow the flow of concrete.</p> <p>(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface and the window reveals.</p> <p>(13) is the ground slab.</p> <p>(14) is the reinforcing steel used to strengthen corners and lintels.</p> <p>(15) is the floor channel.</p>
10	<p>FIGURE 19</p> <p>Shows a sectional plan view BB based on Figure 18.</p> <p>(1) n/a.</p> <p>(2) is a short length PrecisionWall tube filled with concrete and the top of which forms the base for the inside window ledge.</p> <p>(3) is a PrecisionWall tube cut to length to form a lintel support tube.</p> <p>(4) n/a</p> <p>(5) is the U channel fixed at no more than 600mm centres to the PrecisionWall.</p> <p>(6) is the timber batten used to fix the external cladding to the exterior face.</p> <p>(7) is a PrecisionWall tube fitted horizontally by its side face to the wall and just below the tubes shown as (2) to form the window sill. The mating faces of the tubes are drilled to allow concrete to flow between them. The sill upper surface can be dressed with tiles, render etc. The window frame is fixed to the sill upper surface.</p> <p>(8) is a PrecisionWall tube resting on the sill tube and flush against the lintel support tube. The mating faces of the tubes are drilled to allow concrete to flow between them.</p> <p>(9) is the top member of the window tube assembly and is fitted flush against the lintel tube and resting on the tubes described in (8) above.</p> <p>(10) is the first lintel tube which is a PrecisionWall tube laid horizontally on the lintel support tubes and with holes to allow the flow of concrete from the horizontal tube to the vertical tube.</p> <p>(11) is the second lintel tube (this tube can be deleted or duplicated according to the design) and is laid on the first tube with holes in the mating faces to allow the flow of concrete.</p> <p>(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface and the window</p>

5	<p>reveals.</p> <p>(13) is the ground slab.</p> <p>(14) is the reinforcing steel used to strengthen corners and lintels.</p> <p>(15) is the floor channel.</p>
10	<p>FIGURE 20</p> <p>Shows a plan view of section AA on Figure 18.</p> <p>(1) n/a.</p> <p>(2) is a short length PrecisionWall tube filled with concrete and the top of which forms the base for the inside window ledge.</p>
15	<p>(3) is a PrecisionWall tube cut to length to form a lintel support tube.</p> <p>(4) is a standard PrecisionWall tube.</p> <p>(5) n/a</p>
20	<p>(6) is the timber batten used to fix the external cladding to the exterior face.</p> <p>(7) is a PrecisionWall tube fitted horizontally by its side face to the wall and just below the tubes shown as (2) to form the window sill. The mating faces of the tubes are drilled to allow concrete to flow between them. The sill upper surface can be dressed with tiles, render etc. The window frame is fixed to the sill upper surface.</p>
25	<p>(8) n/a</p> <p>(9) n/a</p> <p>(10) n/a</p> <p>(11) n/a</p>
30	<p>(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface and the window reveals.</p> <p>(13) n/a</p> <p>(14) n/a</p> <p>(15) n/a</p>
35	<p>FIGURE 21</p> <p>Shows a sectional plan view of a window based on section AA of Figure 18.</p> <p>(1) n/a</p> <p>(2) n/a</p> <p>(3) is a PrecisionWall tube cut to length to form a lintel support tube and showing the concrete filling.</p> <p>(4) is a standard PrecisionWall .</p> <p>(5) is the U channel fixed at no more than 600mm centres to the PrecisionWall.</p> <p>(6) n/a</p>

		(7) is a PrecisionWall tube fitted horizontally by its side face to the wall and covered by fibre cement sheeting to form a window sill. The mating faces of the tubes are drilled to allow concrete to flow between them. The sill upper surface can also be dressed with tiles, render etc. The window frame is fixed to the sill upper surface.
5		(8) is a PrecisionWall tube resting on the sill tube and flush against the lintel support tube. The mating faces of the tubes are drilled to allow concrete to flow between them.
10		(9) n/a (10) n/a (11) n/a
15		(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface and the window reveals.
20		(13) n/a (14) n/a (15) n/a (16) is a PrecisionWall tube fitted horizontally by its side face to the wall to form the window ledge and is shown covered by a piece of timber. The mating faces of the tubes are drilled to allow concrete to flow between them. The ledge upper surface can also be dressed with tiles, render etc.
25		(17) is the glazing. (18) is the window frame. (19) is a 2H spacer. (20) is plasterboard.
30		(21) is fibre cement sheeting, metal cladding or timber. (22) is a batten to allow fixing of the plasterboard to the room interior and the reveals.

FIGURE 22

		Shows an elevation of a doorway excluding the door frame.
35		(1) is the door opening. (2) n/a
40		(3) is a PrecisionWall tube cut to length to form a lintel support tube. (4) is a standard PrecisionWall tube to which the roof is attached. (5) is the U channel fixed at no more than 600mm centres to the PrecisionWall.
45		(6) n/a (7) n/a

		(8) is PrecisionWall tube resting on the floor and flush against the lintel support tube. The mating faces of the tubes are drilled to allow concrete to flow between them. The door frame is fitted to the vertical inner faces.
5		(9) is the top member of the door tube assembly and is fitted flush against the lintel tube and resting on the tubes described in (8) above.
10		(10) is the first lintel tube which is a PrecisionWall tube laid horizontally on the lintel support tubes and with holes to allow the flow of concrete from the horizontal tube to the vertical tube.
15		(11) is the second lintel tube (this tube can be deleted or duplicated according to the design) and is laid on the first tube with holes in the mating faces to allow the flow of concrete.
		(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface.
		(13) is the ground slab.
		(14) is the reinforcing steel used to strengthen corners.
	FIGURE 23	Shows a sectional elevation BB of a doorway based on Figure 22.
20		(1) n/a.
		(2) n/a.
		(3) is a PrecisionWall tube cut to length to form a lintel support tube.
25		(4) n/a
		(5) is the U channel fixed at no more than 600mm centres to the PrecisionWall.
		(6) n/a
		(7) n/a
30		(8) is PrecisionWall tube resting on the floor and flush against the lintel support tube. The mating faces of the tubes are drilled to allow concrete to flow between them. The door frame is fitted to the vertical inner faces.
35		(9) is the top member of the door tube assembly and is fitted flush against the lintel tube and resting on the tubes described in (8) above.
		(10) is the first lintel tube which is a PrecisionWall tube laid horizontally on the lintel support tubes and with holes to allow the flow of concrete from the horizontal tube to the vertical tube.
40		(11) is the second lintel tube (this tube can be deleted or duplicated according to the design) and is laid on the

	<p>first tube with holes in the mating faces to allow the flow of concrete.</p> <p>(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface.</p> <p>(13) is the ground slab.</p> <p>(14) is the reinforcing steel used to strengthen corners.</p>
5	FIGURE 24
	<p>Shows a sectional plan AA of a doorway based on Figure 22.</p> <p>(1) n/a.</p> <p>(2) n/a.</p>
10	<p>(3) is a PrecisionWall lintel support tube .</p> <p>(4) is a PrecisionWall tube .</p> <p>(5) n/a</p> <p>(6) n/a</p> <p>(7) n/a</p>
15	<p>(8) is PrecisionWall tube resting on the floor and flush against the lintel support tube. The mating faces of the tubes are drilled to allow concrete to flow between them. The door frame is fitted to the vertical inner faces.</p>
20	<p>(9) is the top member of the door tube assembly and is fitted flush against the lintel tube and resting on the tubes described in (8) above.</p> <p>(10) n/a</p> <p>(11) n/a</p>
25	<p>(12) is the timber batten which is used to fix fibre cement sheeting for the outside wall surface.</p> <p>(13) is the ground slab.</p> <p>(14) is the reinforcing steel used to strengthen corners.</p>
30	FIGURE 25
	<p>Shows a join between two walls at 90 degrees to each other.</p> <p>(1) is a standard PrecisionWall tube.</p> <p>(2) is a portion of a standard PrecisionWall tube which has been cut to fit the gap between the type 1 tubes.</p> <p>(3) is the balance of the tube described in (2) above.</p> <p>(4) is a sleeve which is drilled on its side wall to match the standard hole pattern.</p> <p>(5) is steel reinforcing resting in the inverts of the holes in the side walls.</p>
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	FIGURE 26	<p>Shows a typical corner join.</p> <p>(1) is a standard PrecisionWall tube.</p> <p>(2) is a portion of a standard PrecisionWall tube which has been cut to fit the gap between the type 1 tubes.</p> <p>(3) is the balance of the tube described in (2) above.</p> <p>(4) is a sleeve which is drilled on its side wall to match the standard hole pattern.</p> <p>(5) is steel reinforcing resting in the inverts of the holes in the side walls.</p>
45	FIGURE 27	<p>Shows a sectional elevation of a completed PrecisionWall after a concrete pour but before the scaffolding system has been removed.</p> <p>(1) is the concrete face in the section of the PrecisionWall tube.</p> <p>(2) is a 3H spacer between the sectioned PrecisionWall tube and the tube at the rear. The spacer is cut to length to allow for the intended placing of the scaffold C section.</p> <p>(3) is a 1H spacer which allows the scaffold system to clamp the tubes.</p> <p>(4) is the hole through which the scaffold bolt is withdrawn.</p> <p>(5) are the C section steel scaffold members which provide a true surface for the PrecisionWall tubes.</p> <p>(6) is a typical bolt which holds the C sections to the scaffold frame. The bolts are at regular spacings and can be at different heights to suit the building design.</p> <p>(7) is the scaffold frame which is a parallel truss drilled with holes to allow multiple adjustments.</p>
50	FIGURE 28	<p>Shows a side elevation of PrecisionWall tubes erected and clamped in place ready for the concrete pours.</p> <p>(1) is the side wall of the nearest PrecisionWall tube.</p> <p>(2) is 3H spacers set above and below the C section.</p> <p>(3) is the 1H spacer</p> <p>(4) is the C section.</p> <p>(5) is the scaffold bolt.</p> <p>(6) is the floor channel.</p> <p>(7) is a spacer which accurately locates the base of the scaffold to the PrecisionWall tubes.</p> <p>(8) is the ground slab.</p> <p>(9) is the vertical truss which has multiple holes</p>

	<p>drilled in the vertical members to allow adjustment for the C channel.</p> <p>(10) is the pair of adjustable bracing bars for each truss.</p> <p>(11) is the base of the scaffold which also forms a base for the ballast tank.</p> <p>(12) are the articulated joints which allow the vertical section of the scaffold to be adjusted.</p> <p>(13) is the ballast tank which is water filled after being placed on the scaffold base.</p> <p>(14) is the work platform from which the operator can direct the suspended concrete delivery hose to the top openings of the PrecisionWall tubes.</p> <p>(15) is the safety rail system.</p>
	<p>FIGURE 29</p> <p>Shows a sectional elevation of PrecisionWall using an outer wall of precast concrete and fibre cement sheet over studwork.</p> <p>(1) is a PrecisionWall tube filled with concrete.</p> <p>(2) is the surface of the concrete.</p> <p>(3) is a 2H spacer</p> <p>(4) is plasterboard fixed to the 2H spacer.</p> <p>(5) is the floor channel.</p> <p>(6) is the ground slab.</p> <p>(7) is the precast concrete panel.</p> <p>(8) is the steel stud.</p> <p>(9) is the vertical timber batten.</p> <p>(10) is the horizontal timber batten.</p> <p>(11) is the fibre cement sheet.</p>
	<p>FIGURE 30</p> <p>Shows a sectional elevation of PrecisionWall using an outer wall of conventional brickwork.</p> <p>(1) is a PrecisionWall tube filled with concrete.</p> <p>(2) is the surface of the concrete.</p> <p>(3) is a 2H spacer</p> <p>(4) is plasterboard fixed to the 2H spacer.</p> <p>(5) is the floor channel.</p> <p>(6) is the ground slab.</p> <p>(7) is the brick wall.</p> <p>(8) is the strap tying the brick wall to the PrecisionWall.</p>

ABSTRACT

A modular plastic formwork system for integrated plastic and concrete walls with H section spacers which allow accurate and easy fixing of plasterboard is disclosed.

The plastic formwork is light and allows accurately dimensioned load bearing walls to be rapidly constructed.

The formwork can use the same modular dimensions which are standard in the building industry thereby allowing items such as standard windows, doors and cladding material to be used.

The tubular formwork has perforated interfaces thereby creating an integrated mass of concrete which produces a rigid structure.

The plastic interfaces of the tubes allow easy penetration of fixing screws for studwork forming the outer walls.

The plastic outer layers are waterproof and the composite layers of plastic and concrete form a highly moisture resistant wall.

Bricklaying and plastering are taken off the critical path thereby allowing buildings to be quickly constructed when there are brick and labour shortages.

Construction to higher levels of finish and strength at all times is possible compared with existing methods.

The finished buildings will appear to be conventional construction but will have stronger, more accurately dimensioned waterproof and better insulated inner wall cores giving high levels of thermal and acoustic efficiency.

CLAIMS

The claims defining the invention are:-

- 1) H section plastic spacers locate the plastic tubes and provide an accurate face for fixing plasterboard sheeting.**
- 2) The rigid plastic extruded tubes use dimensions which conform with current housing material dimensions and thereby allow quick fixing of other materials forming the wall system.**
- 3) The plastic formwork tubes have perforated side walls which allows the concrete core to form a continuous mass thereby enhancing strength and preventing movement which leads to wall cracks and failure with rendered brick walls. Reinforcing steel can easily be added to provide higher strength levels.**
- 4) The plastic tubes and concrete provide a waterproof layer which prevents dampness from entering the interior house space.**
- 5) The plastic and concrete walls are load bearing and can be aesthetically finished by using plaster board on the inside and conventional non-load bearing walls of brick, fibre-cement sheeting, metal sheeting, timber and precast concrete panels on the outside.**
- 6) Alternatively an integrated stud system can be used with the PrecisionWall system to give an economical wall which can have high levels of energy efficiency.**
- 7) The plastic and concrete walls will allow very accurately dimensioned walls to be constructed thereby allowing succeeding trades to achieve higher standards of finish at lower costs..**
- 8) The tubes and the assembly systems are shown in attached Figures 1 to 30.**

**A.H.C. Carlisle
as the Applicant.
(A.H.C. Carlisle is Trustee for the
Precision Wall Discretionary Trust**

24rd November 2003.

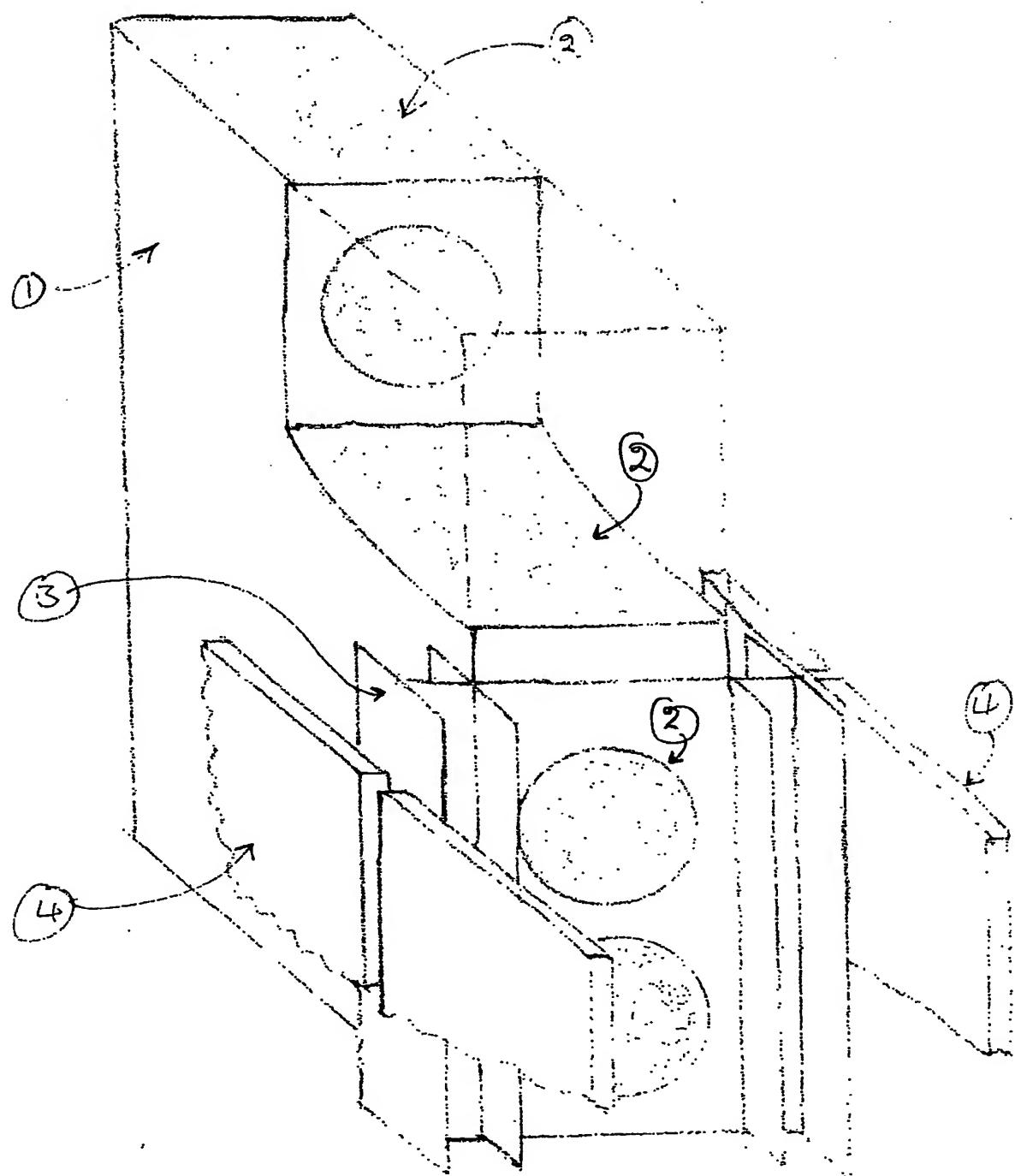


FIGURE 1.

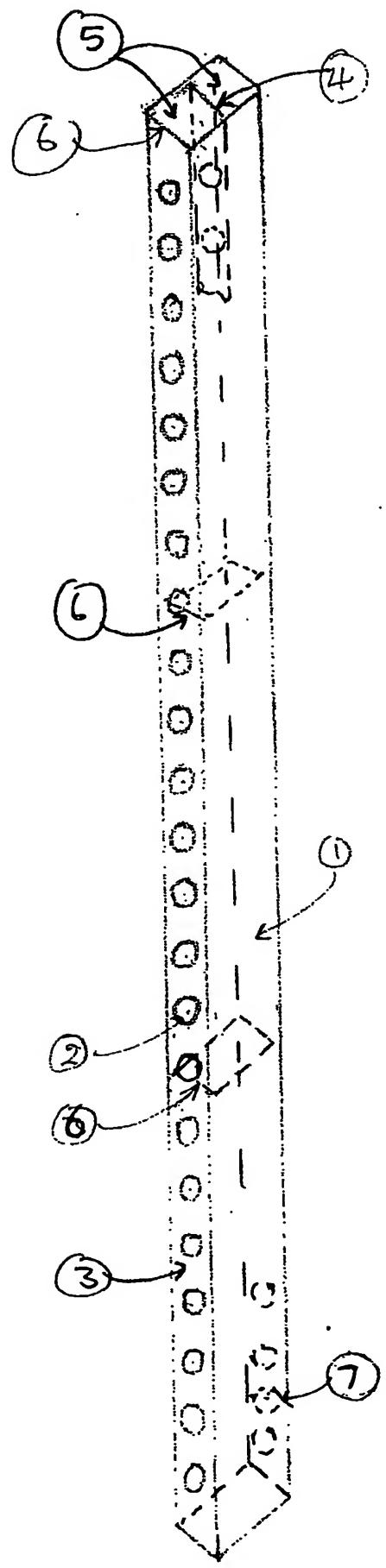


FIGURE 2

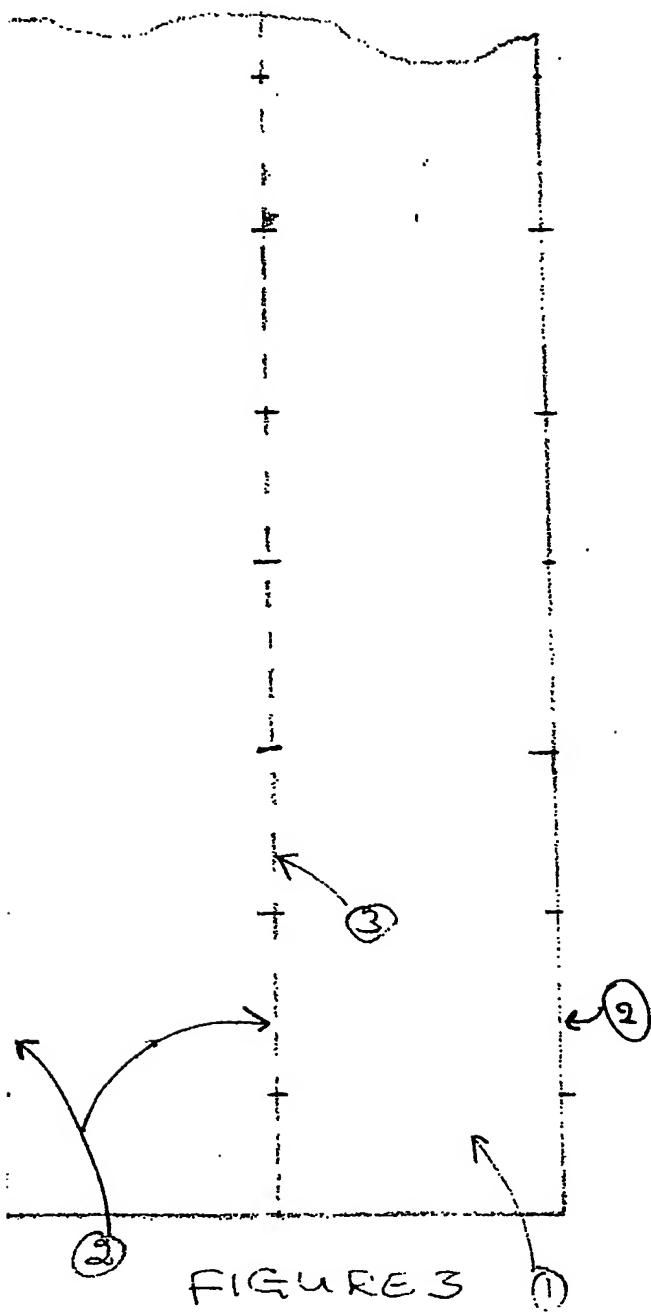


FIGURE 3

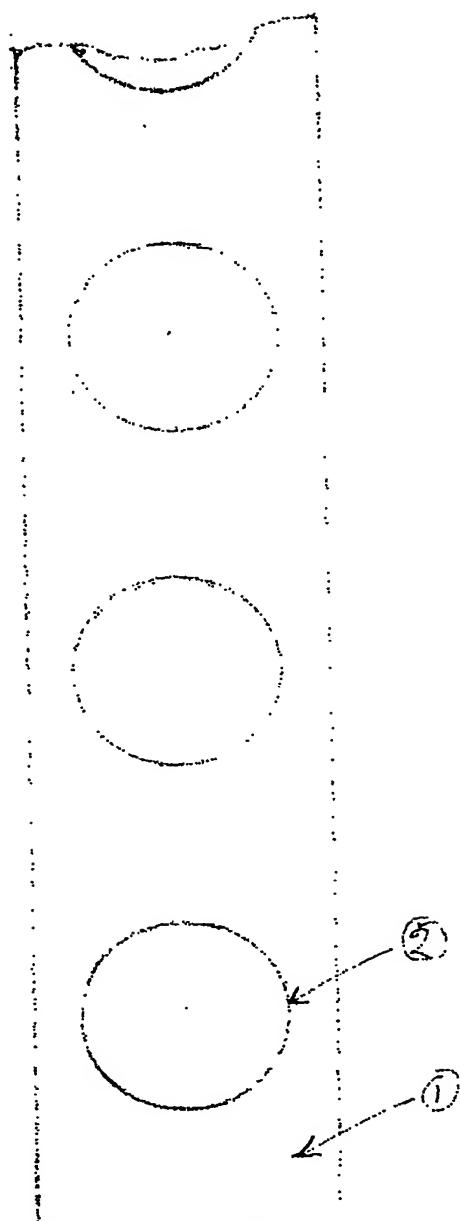


FIGURE 5

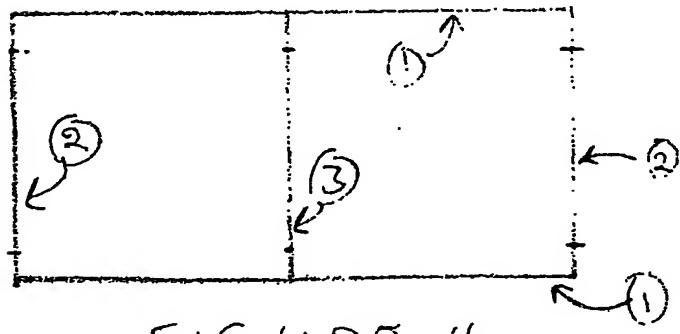


FIGURE 4.

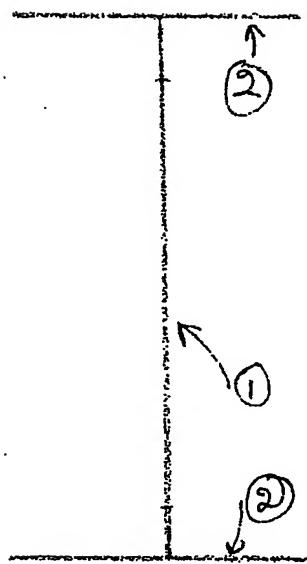


FIGURE 6

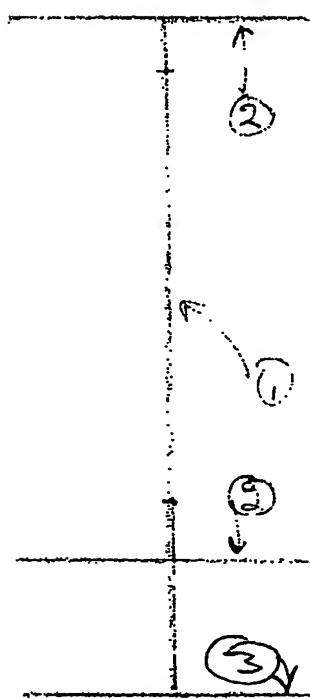


FIGURE 7

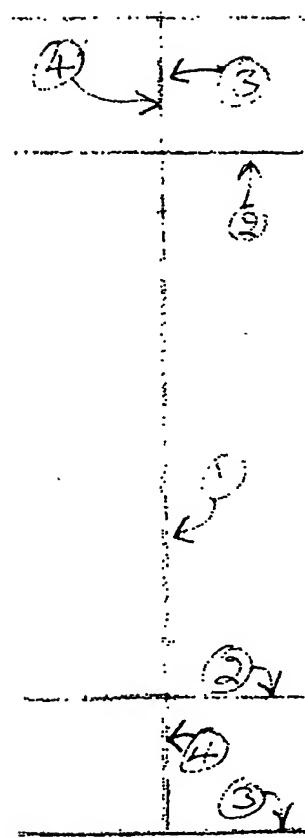


FIGURE 8

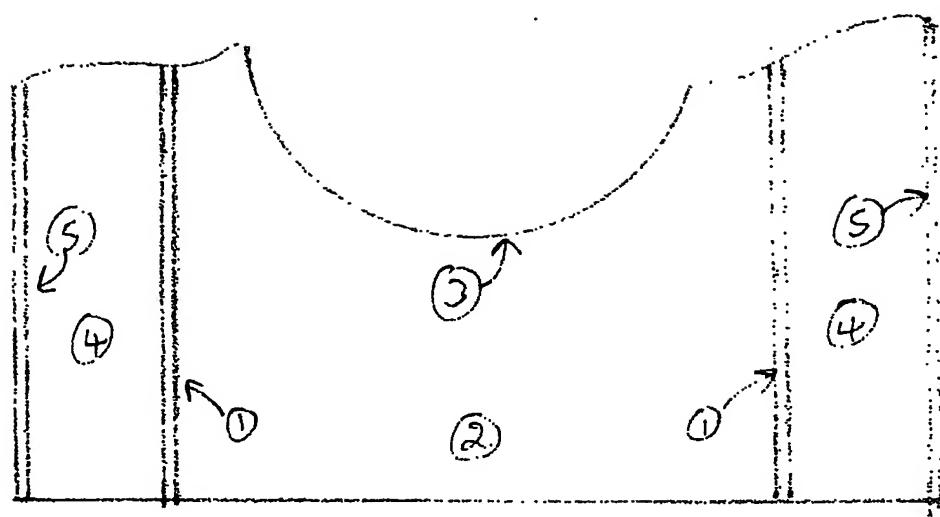


FIGURE 11

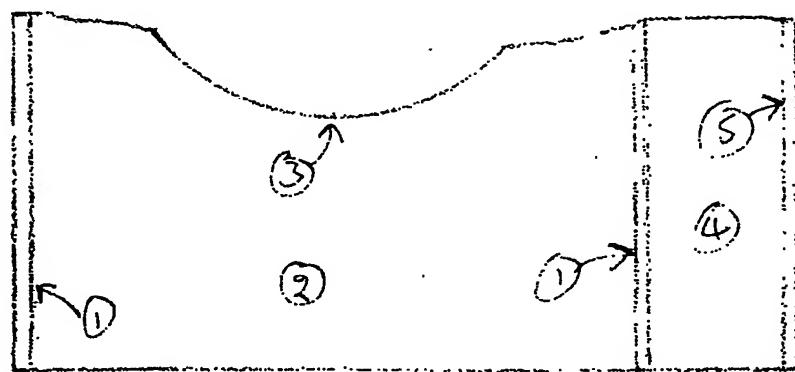


FIGURE 10

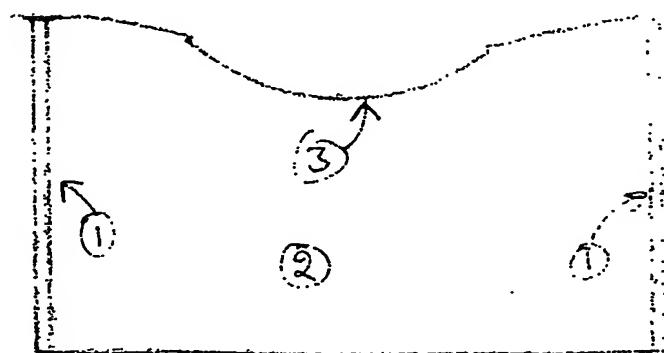
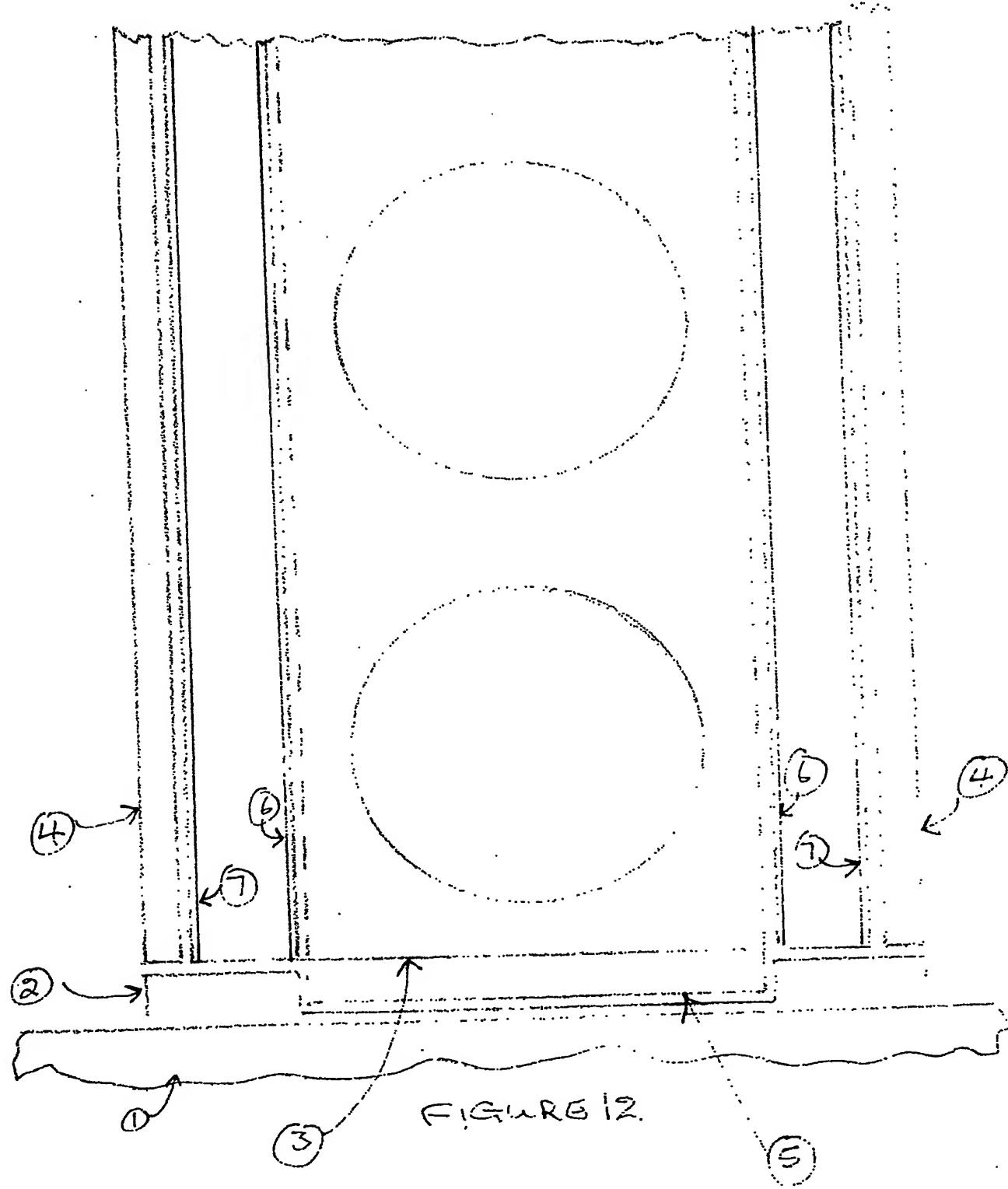


FIGURE 9



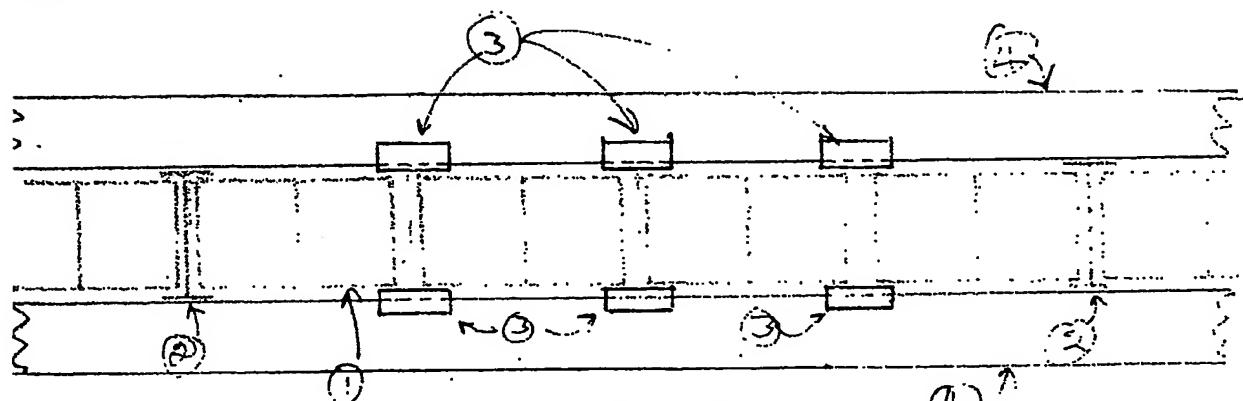


FIGURE 13

(4)

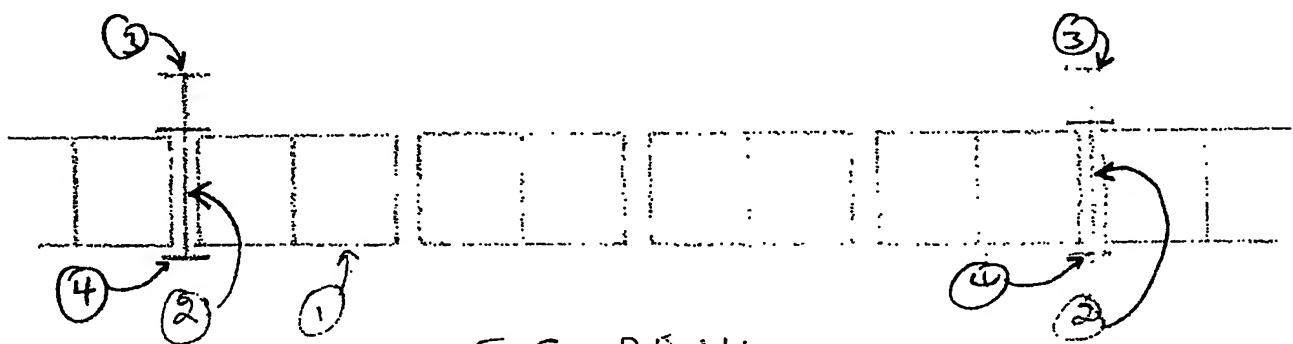


FIGURE 14

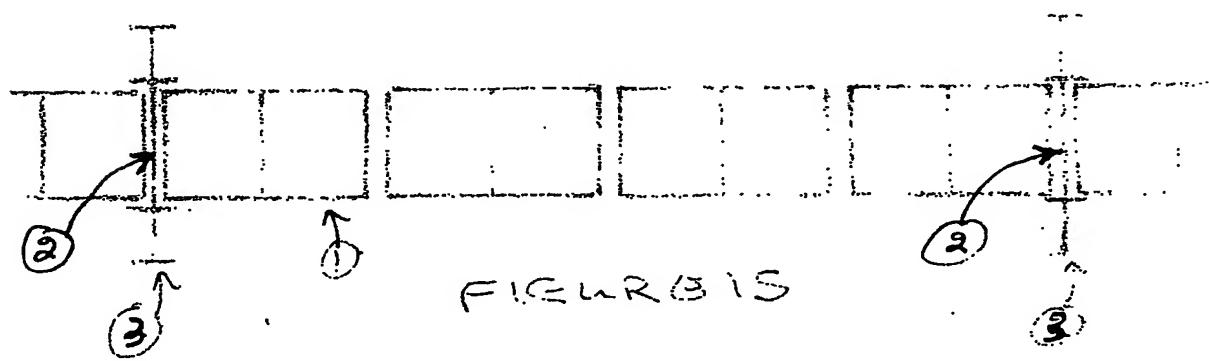
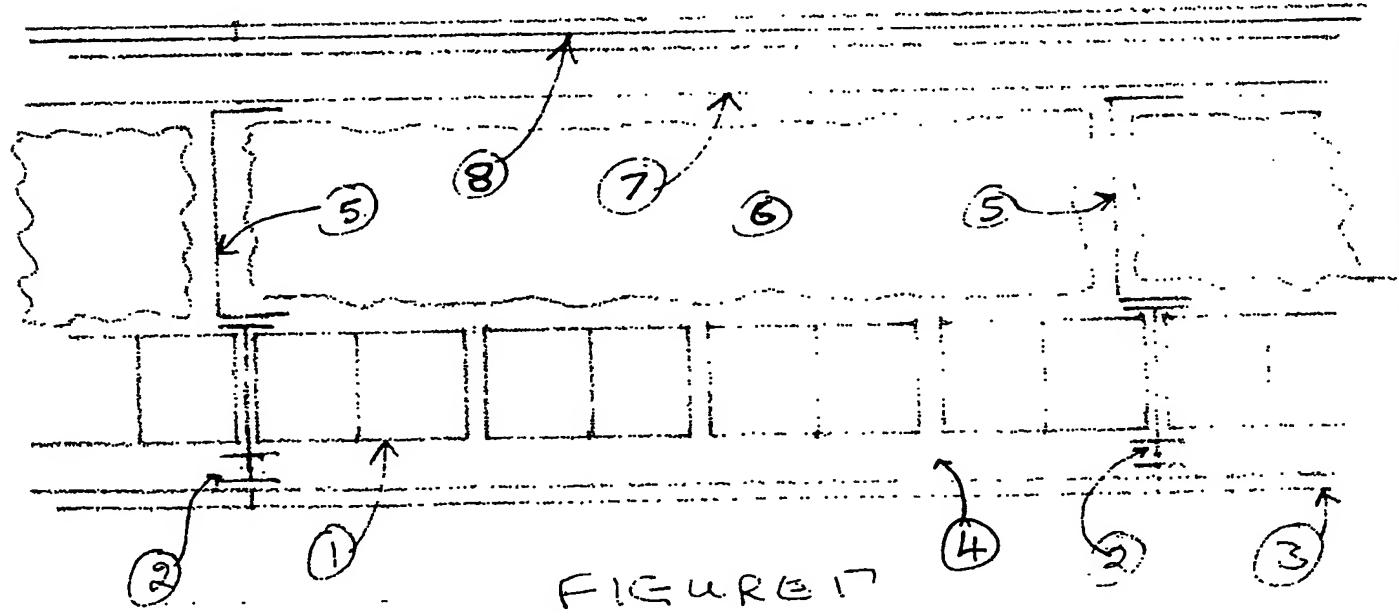
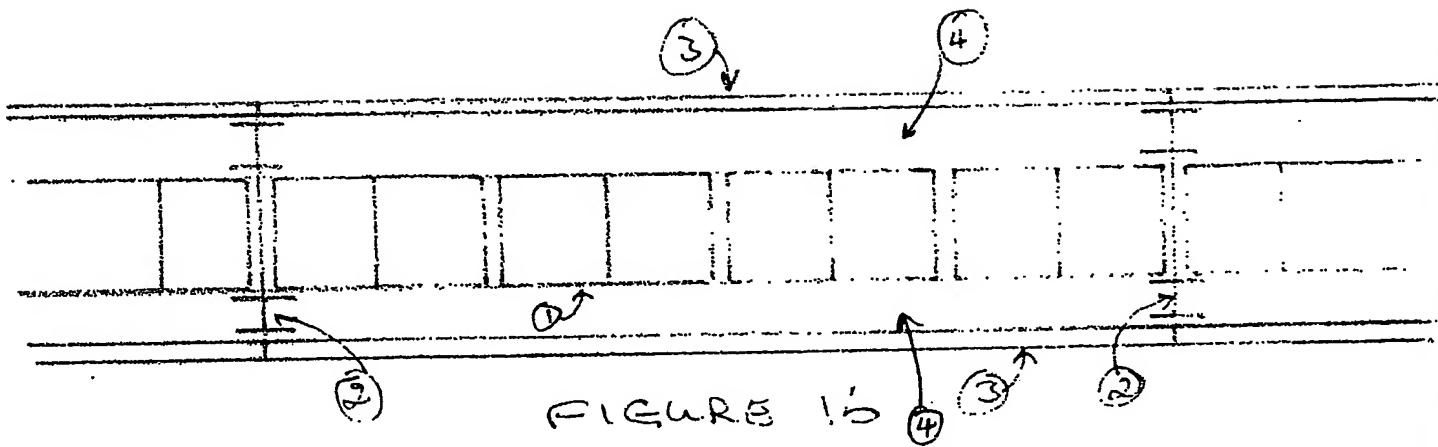


FIGURE 15



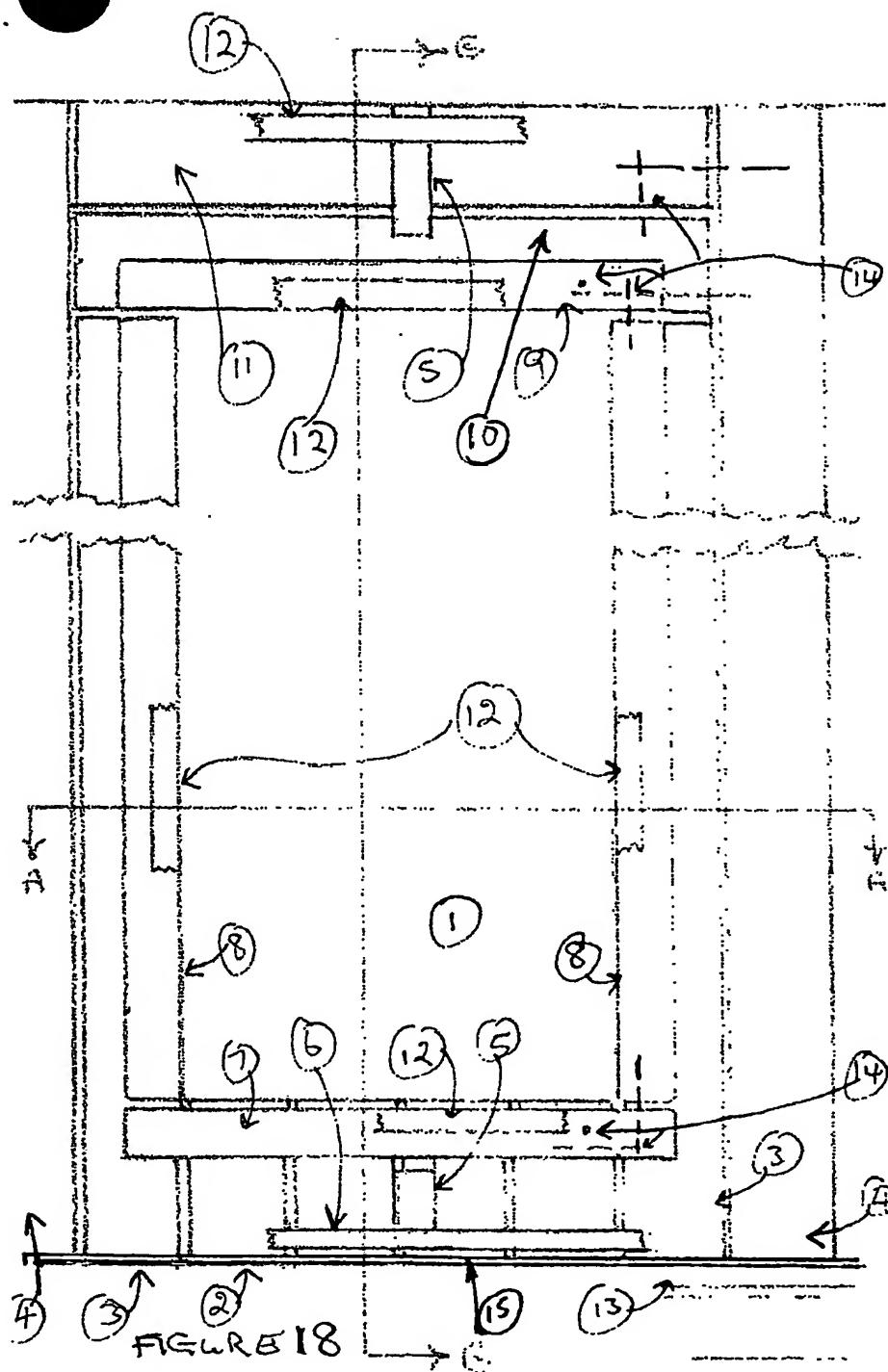


FIGURE 18

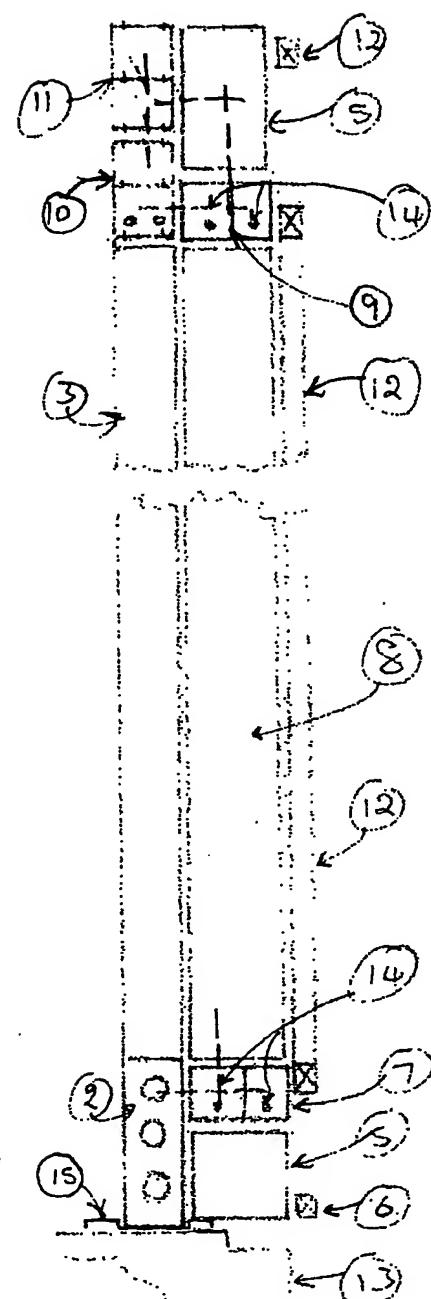


FIGURE 19

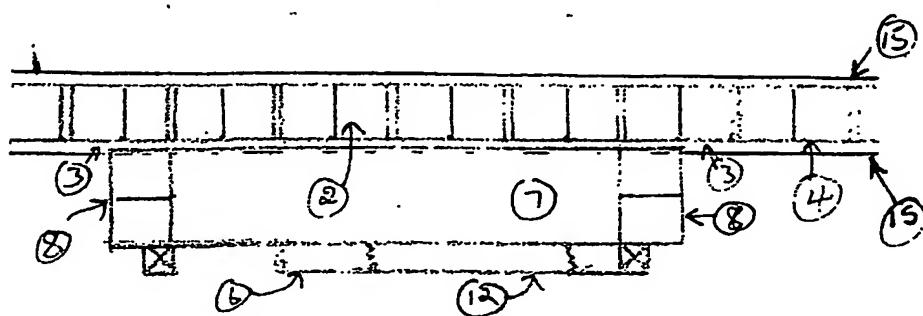


FIGURE 20

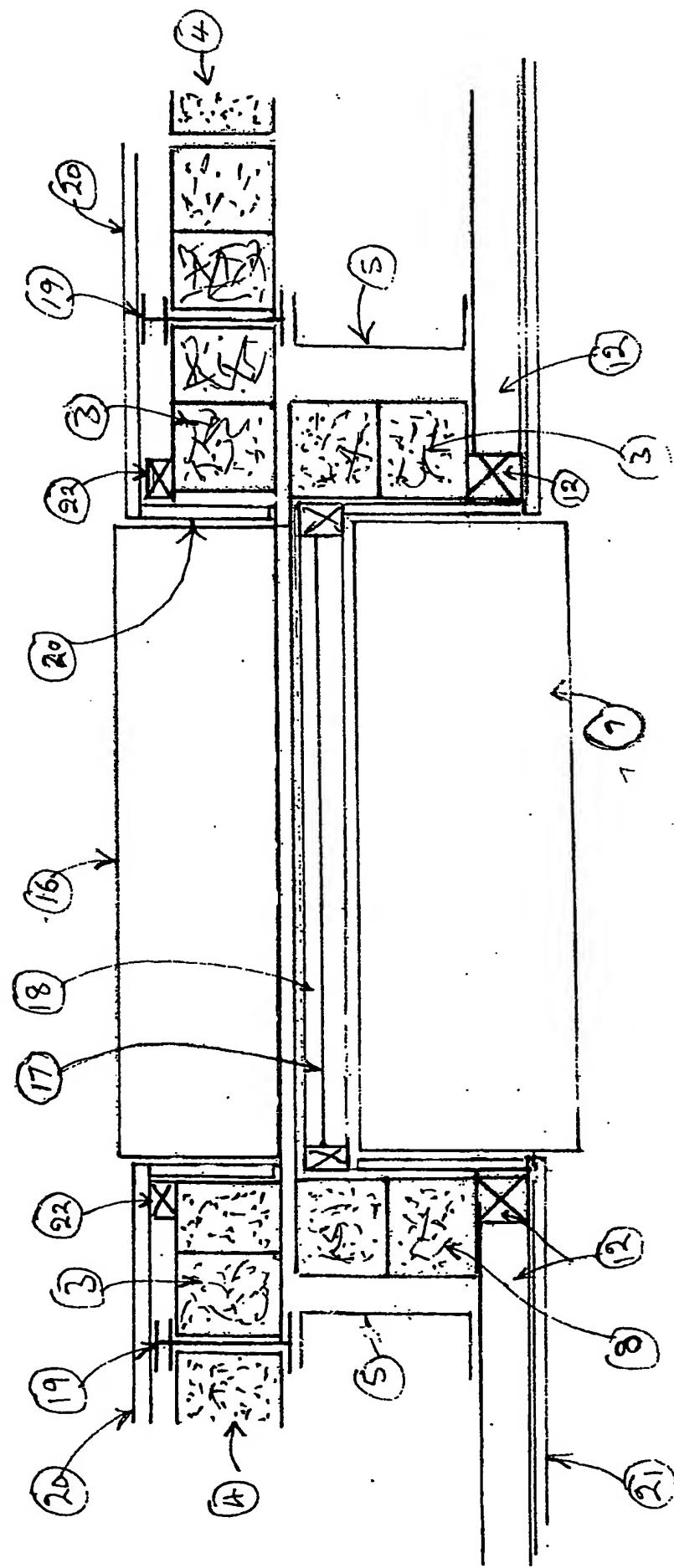


FIGURE 21

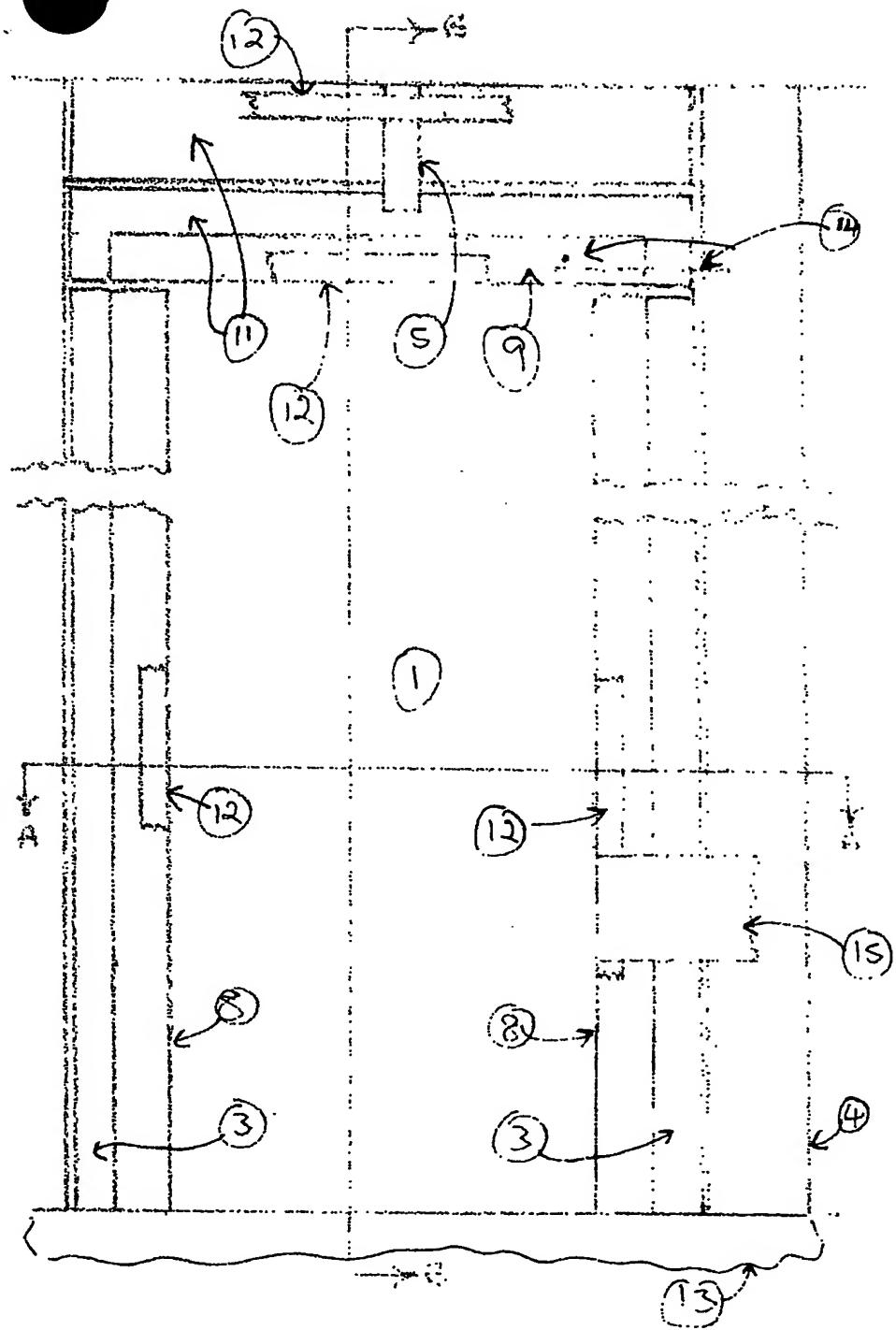


FIGURE 22

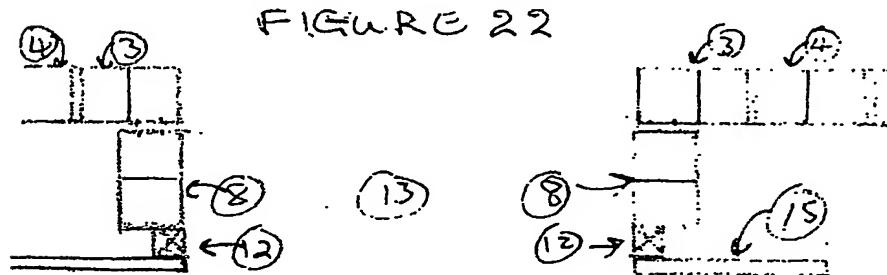


FIGURE 23

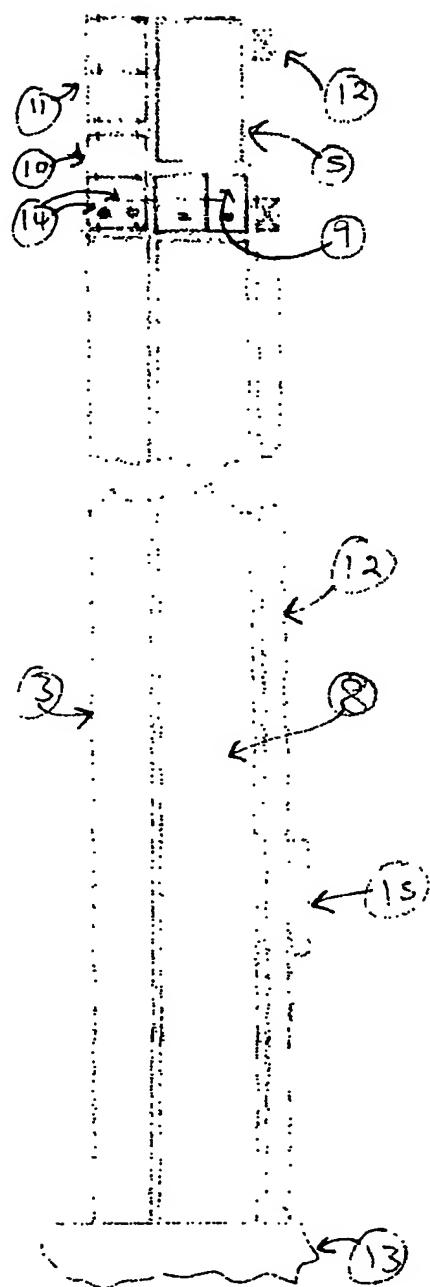


FIGURE 24

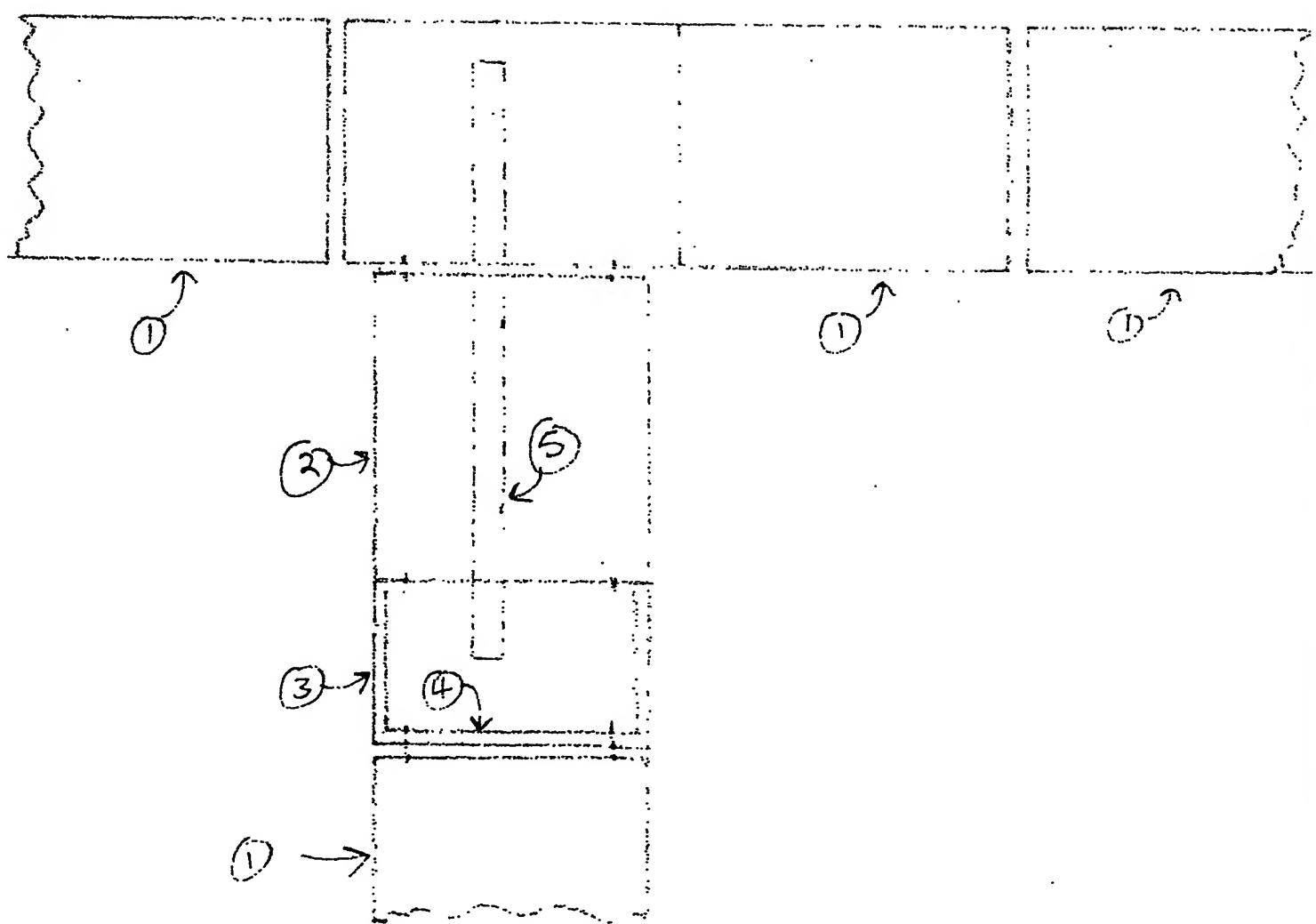


FIGURE 25

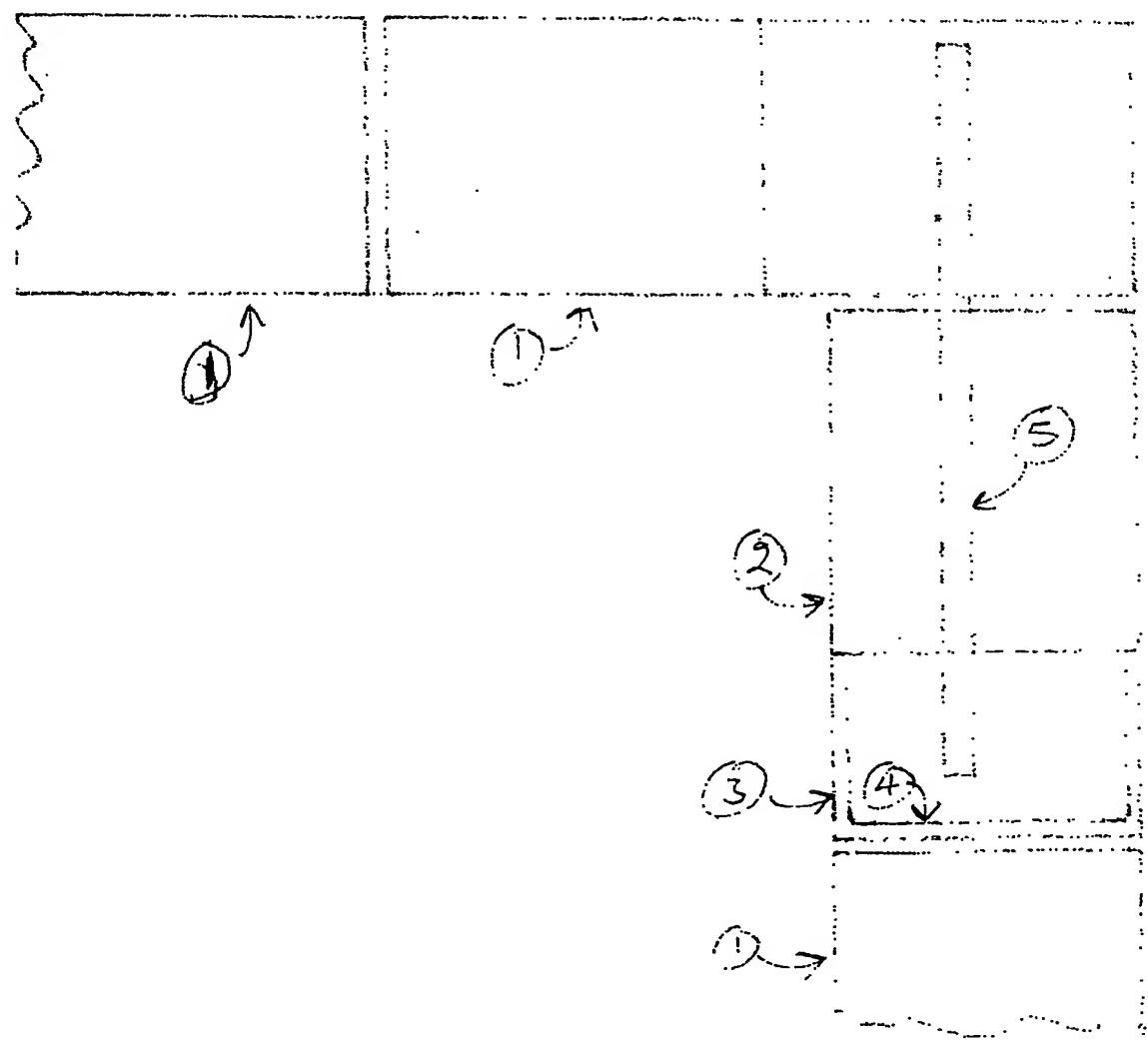


FIGURE 26

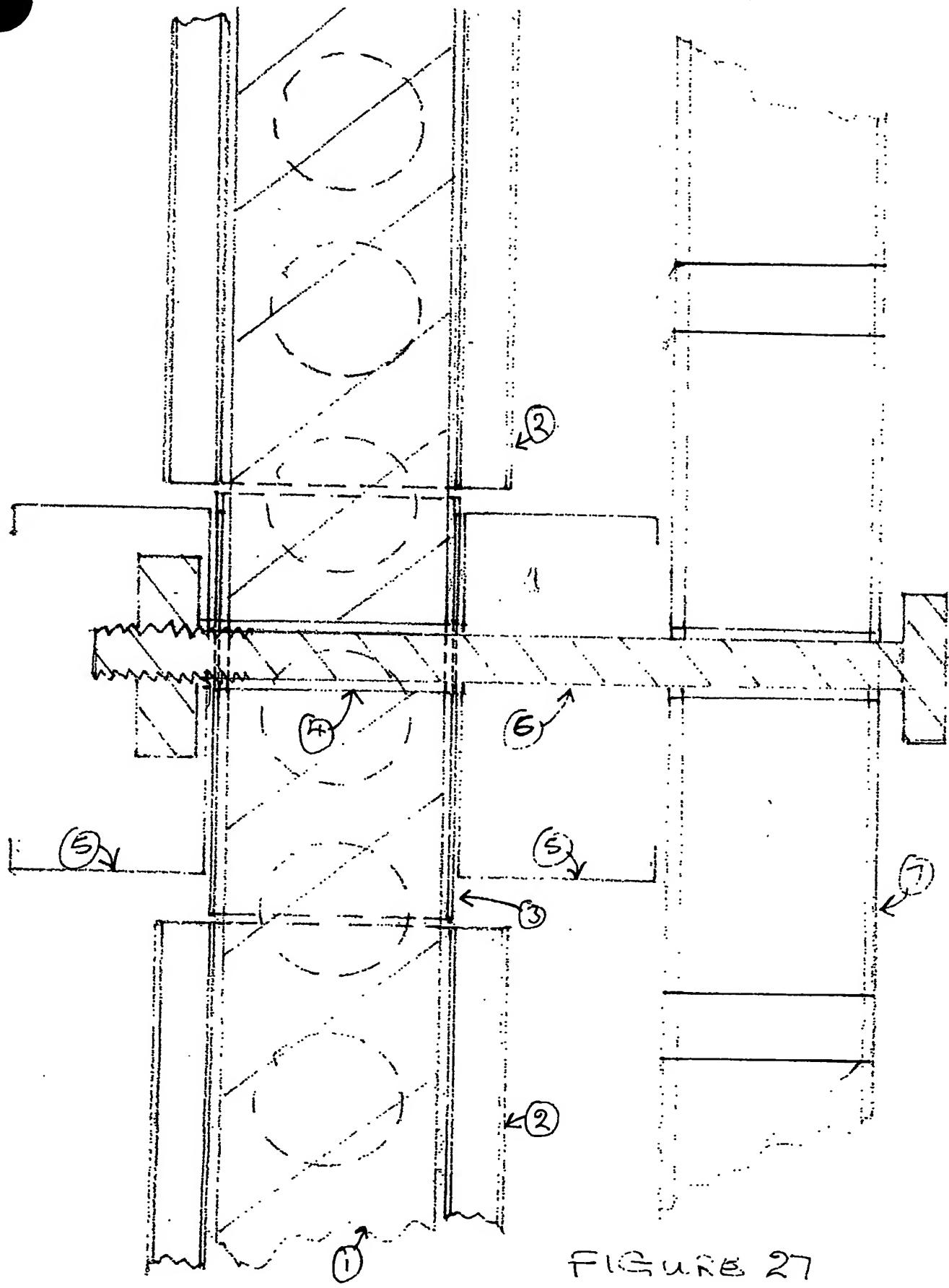


FIGURE 27

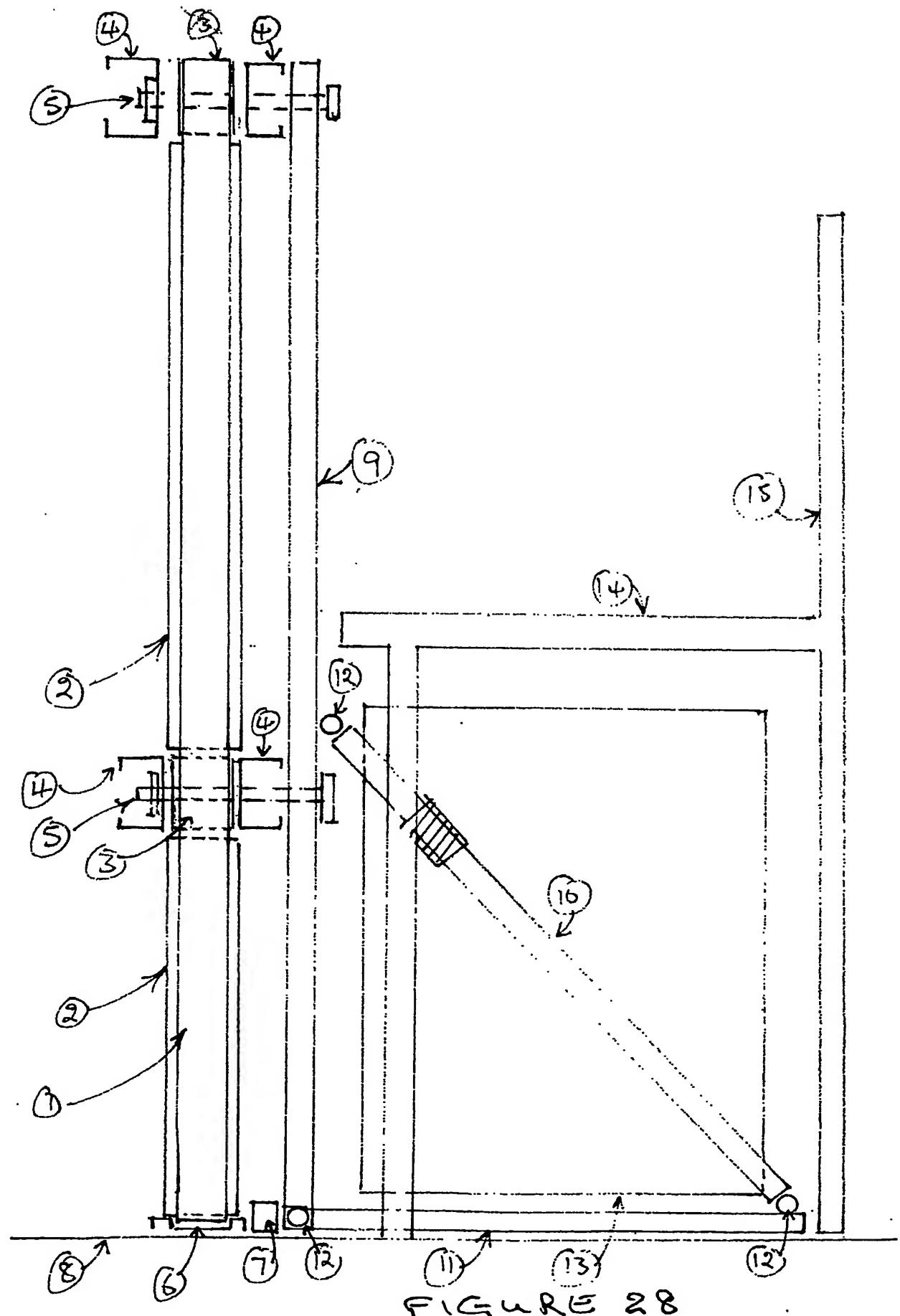


FIGURE 28

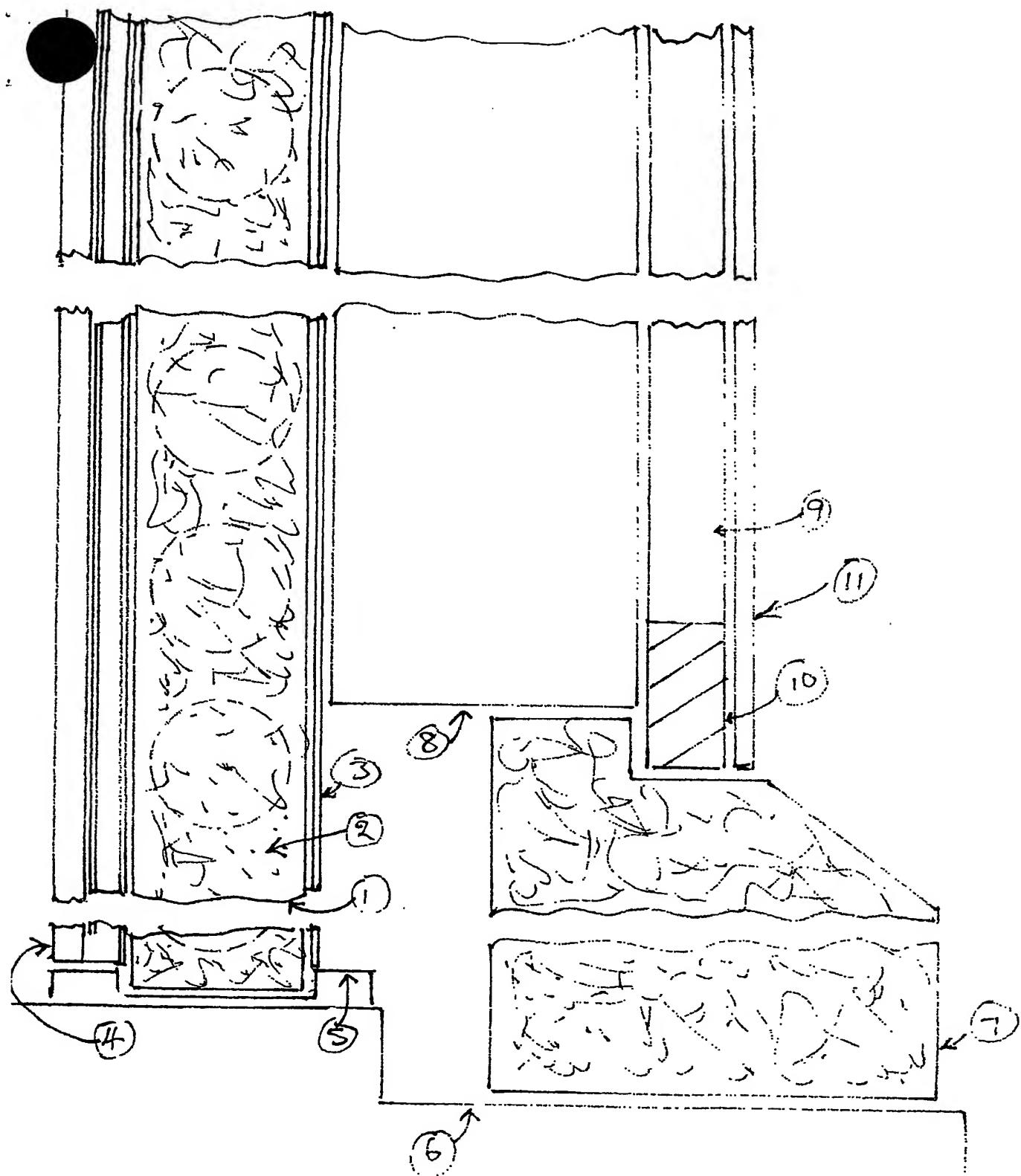


FIGURE 29

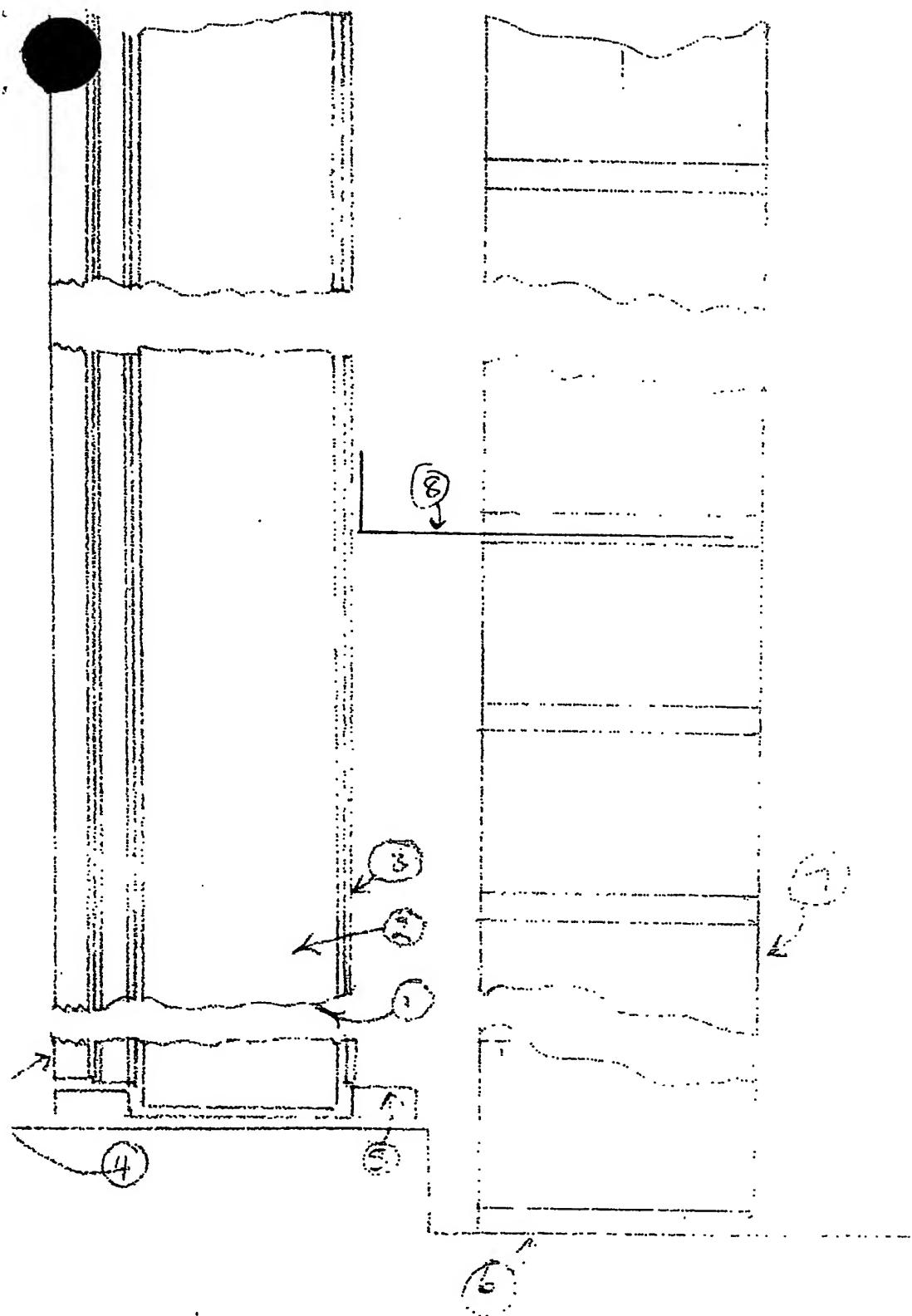


FIGURE 30

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